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Wolff Law Offices, PLLC  
Amendment and Response

Appl. Ser. No. 10/813,484

### REMARKS

Applicants hereby submit this Response and Amendment to respond to the Office Action dated June 16, 2006, and by rule it is timely filed today September 18, 2006 due to September 16, 2006 being a Saturday.

Applicants submit herewith a letter and excess claim fee in the amount of \$350.00 for seven (7) additional dependent claims, now making 27 total claims (3 independent claims and 24 dependent) pending in the application.

Applicants thank the Examiner for his comments regarding the proper language and format for an abstract of the disclosure. A replacement Abstract is submitted herewith, which Applicants believe complies with the Examiner's request. A separate page containing the replacement abstract is appended hereto. Accordingly, Applicants respectfully request the Examiner withdraw his objection to the Abstract and approve the replacement Abstract submitted herewith.

Applicants thank the Examiner for his remarks regarding the Figures 5-9 descriptions of each chart. The Examiner stated that Fig. 5-9 should have a description of each chart. Applicants respectfully submit, however, that a description of each chart depicted in Figures 5-9 is, in fact, included in the Specification as originally filed. To support this position, Applicants direct the Examiner to Paragraphs [0030] to [0035] on pages 10-12 of the Specification. However, to make it more clear for the Examiner, Applicants have added a separate description of each of FIGs 5-9. Therefore, Applicants respectfully request the Examiner withdraw his objection to the descriptions of each chart for Figures 5-9.

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Applicants thank the Examiner for his comments pertaining to two objections regarding the drawings. First, the drawings were objected to as failing to comply with 37 CFR 1.84(p)(5) because reference characters 111, 121, 131, 141, 220, and 305 were not mentioned in the description. Paragraph [0020] of the Specification has been amended to mention reference character 305 and paragraph [0022] of the Specification has been amended to mention reference characters 111, 121, 131, 141 and 220. Therefore, Applicants believe that the first objection to the drawings has been overcome and respectfully request the Examiner remove this objection.

Secondly, the drawings were objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters 210 and 110 were both used to designate a physical node. Paragraph [0022] of the Specification has been amended to correctly place reference characters 210 and 220 to the proper slots described for FIG. 2, and to add reference number 110 for the physical node. Accordingly, Applicants believe that this second objection to the drawings has been overcome and respectfully request the Examiner remove this objection.

Claims 1-20 have been examined. New Claims 21-27 have been added by this Amendment to more completely claim the invention of the subject application.

Claim 1 was rejected under 35 USC 112, second paragraph, as having insufficient antecedent basis for the term "each node" found in line 2 of Claim 1. This rejection is respectfully traversed. Applicants have amended Claim 1, line 1, by inserting "having a plurality of nodes". For at least this reason, Applicants believe the rejection of Claim 1 for insufficient antecedent basis has been overcome, and respectfully request the Examiner withdraw this rejection.

Claim 9 was rejected under 35 USC 112, second paragraph, as having insufficient antecedent basis for the term "the hashkeys" found in line 1 of Claim 9. This rejection is

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respectfully traversed. Applicants have amended Claim 9 so as to be dependent on Claim 8 instead of Claim 7 so that there is now proper antecedent basis for "the hashkeys". Accordingly, Applicants believe the rejection of Claim 9 for insufficient antecedent basis has been overcome, and respectfully request the Examiner withdraw this rejection.

Claims 1-20 were rejected under 35 USC 102(e) as being anticipated by Zhang (U.S. Patent No. 6,985,928). This rejection is respectfully traversed. Claims 16, 17, and 18 have been amended to more clearly claim the invention of the subject application. Applicants respectfully submit that these amendments do not narrow the scope of the claims, but are made merely to help the Examiner more clearly understand the scope of the invention because the term "storage" is inherent in the claims when read in light of the Specification. For the following reasons, Applicants respectfully submit that Claims 1-20 and new claims 21-27 of the present invention are patentable over Zhang.

The present invention is directed to improving utilization in a peer-to-peer network. In at least one embodiment, each node in a peer-to-peer network is assigned a number of preferably fixed-size storage slots proportional to the node storage, a first portion of which may be allocated to storage zones and a second portion of which may be allocated as a free slot reserve. (See, for example the Abstract; the Summary of the Invention, at least paragraph [0004]; and Detailed Description of the Embodiments, at least paragraph [0017]). As noted in the Specification, **each storage zone is a subspace of the hashkey space which is hosted at a particular slot in a particular physical node.** (See, for example, the Detailed Description of the Embodiments, paragraph 13, lines 13-14). (Emphasis added).

On the other hand, Zhang is directed to "a method for placing an object at a node in a peer-to-peer system based on a zoom-in algorithm." (See, for example, Zhang at the Summary of

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the Invention, column 1, lines 31-53). The method in Zhang “**comprises selecting a parent zone having a plurality of nodes in the peer-peer system, wherein the parent zone includes a node hosting a parent object.**” (See, for example, Summary of the Invention, column 1, lines 32-35). (Emphasis added). Moreover, Zhang also teaches “dividing the parent zone into k subzones; selecting one of the subzones; **selecting a node in the selected subzone;** and placing the object in the selected subzone.” (See, for example, Summary of the Invention, column 1, lines 35-38). (Emphasis added).

With respect to the Examiner’s rejection of Claim 1 in light of Zhang, Applicants respectfully submit that at least one particular salient distinction between Zhang and the present invention was misconstrued; Zhang does not teach, suggest, or disclose placing storage zones **within a node.** In the Office Action, dated June 16, 2006, the Examiner stated that both the present invention and Zhang teach a “p2p system consisting of nodes being in storage zones.” (See Page 5, line 2). On the other hand, the claims of the present invention are directed to storage zones **within a node and not to storage zones containing nodes.** In fact, Zhang never refers to “the zone,” “parent zone,” or “subzone(s)” as storage zones as suggested by the Examiner. Rather, Zhang teaches that the “zone” is a logical space including one or more objects. (See Zhang at, for example, column 3, lines 55-67) As clearly stated in Claims 1 (and 11), the method of the present invention has “allocating one or more storage slots at each node in a peer-to-peer network, and a first portion of the storage slots allocated for storage zones and any remaining storage slots at each node allocated as a free slot reserve.” (Emphasis added). This element of Claim 1 (and 11) is clearly not disclosed in Zhang.

The Examiner also rejected Claim 1 in light of Zhang, stating that both teach a “parent zone split into two subzones, zones being crowded placing object in other subzone.” (See June

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16, 2006, Office Action, page 5, lines 8-9). Zhang teaches “placing child objects in close proximity to parent objects.” (See, Zhang, column 3, lines 44-45). Accordingly, Zhang is directed at placing objects according to a parent-child relationship. The claims of the present invention, however, does not require such parent-child relationship in placing an object. Instead, as stated in Claim 1, “when a storage zone reaches **full capacity**, splitting the data in the storage zone into a first and second portion, allocating a **free slot** reserve storage slots as a new storage zone, and transferring the second portion of the data to the new storage zone.” Zhang does not teach, suggest, or disclose splitting data “when a storage zone is full” or “allocating a **free slot** as a new storage zone.” For at least the aforementioned reasons, Applicants respectfully submit that Claim 1 of the present invention is patentable over Zhang. Therefore, Applicants respectfully request the Examiner to remove the rejection to Claim 1 or indicate more specifically where Zhang teaches each and every limitation of Claim 1.

Claims 2-9 are dependent on Claim 1 and are therefore distinguishable over Zhang for at least the reasons set forth above with respect to Claim 1. For the following additional reasons, Applicants submit that claims 2-9 are further patentable over Zhang.

With respect to the Examiner’s rejection of Claim 2 in light of Zhang, Zhang does not teach, suggest, or disclose a method for a peer-to-peer network in which “each node is allocated more storage slots than its actual physical capacity,” as stated in Claim 2. Zhang describes storage utilization as “the memory capacity being used to store objects in a node at a given time.” (See, for example, Column 5, lines 17-19). Further, Zhang teaches that “storage capacity may be over 80%” (See, for example, Column 5, lines 21). (Emphasis added). In contrast, the present invention teaches that “each node is allocated more storage slots than its actual physical capacity.” (See, for example, Specification paragraph [0022]). Applicants respectfully submit

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that, with respect to the present invention, Claim 2 is patentable at least for the reasons stated above, and this additional reason that Zhang does not teach, suggest, or disclose that each node is allocated more storage slots than its actual physical capacity. Therefore, Applicants respectfully submit that the Examiner's rejection of Claim 2 has been overcome and Claim 2 is patentable over Zhang.

With respect to the Examiner's rejection of Claim 3 in light of Zhang, Zhang does not teach, suggest, or disclose a method in which each node is allocated  $N-1$  virtual slots for each  $N$  storage slots allocated, as stated in Claim 3. Zhang fails to even mention the terms "slot" or "virtual slots." Applicants cannot find anywhere in Zhang in which such an approach is even suggested. Further, Applicants cannot find the allocation of storage slots within a node taught anywhere in Zhang. Applicants respectfully submit that, with respect to the present invention, Claim 3 is patentable at least for the reasons stated above. Moreover, this claim is patentable at least for the additional reason that Zhang does not anticipate, teach, or suggest that each node's allocation of a number of virtual slots is based upon the number of storage slots allocated. Therefore, Applicants respectfully submit that Claim 3 is patentable over Zhang and respectfully request the Examiner remove this rejection to Claim 3 of the present invention.

With respect to the Examiner's rejection of Claim 4 in light of Zhang, Zhang does not teach, suggest, or disclose a method in which a storage zone at a node is transferred to another node in the peer-to-peer network if the data inserted into the storage zones at the node fills the actual physical capacity of the node. Instead, in Zhang a node may be randomly selected for placing an object and becomes the starting point in a hill-climbing algorithm for placing an object. Storage utilization for all neighbor nodes is determined, and the neighbor node with the lowest storage utilization is selected for possible placement of the object. Zhang does not even

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mention transferring "a storage zone." Further, Zhang does not require a node's actual physical capacity to be filled before transferring data to a neighbor node. (See, for example, column 4, line 39 – column 5, line 56). On the other hand, in the present invention, as more and more data is added to each storage zone, a storage zone can be split so that a portion of the data in the storage zone can be transferred to a free slot reserve slot which is converted into a new storage zone. Such a split of a storage zone is delayed until the storage zone becomes full. When there are no more free slot reserve slots available at a node, a storage zone can be transferred to another node in the peer-to-peer network. Applicants respectfully submit that, with respect to the present invention, Claim 4 is patentable at least for the reasons stated above. Moreover, this claim is patentable for at least the additional reason that Zhang does not anticipate, teach, or suggest that each node is allocated more storage slots than its actual physical capacity. Therefore, Applicants respectfully submit that Claim 4 is patentable over Zhang and respectfully request the Examiner remove the rejection of Claim 4.

With respect to the Examiner's rejection of Claim 5 in light of Zhang, as previously mentioned there is no teaching or suggestion in Zhang of "transfer of the storage zone." Therefore, Applicants respectfully request the Examiner to identify more specifically where and how Zhang discloses the aspects of Claim 5, or withdraw the rejection. Claim 5 is patentable over Zhang.

With respect to the Examiner's rejection of Claim 6 in light of Zhang, there is no teaching or suggestion of transferring a "new storage zone...to a free slot reserve on a different node." Therefore, Applicants respectfully request the Examiner to identify more specifically where and how Zhang discloses the aspects of Claim 6, or withdraw the rejection. Claim 6 is patentable over Zhang.

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With respect to the Examiner's rejection of Claim 7 in light of Zhang, as previously mentioned there is no teaching or suggestion in Zhang of "a local search for candidate nodes in a transfer set...conducted prior to transfer of the new storage zone." Therefore, Applicants respectfully request the Examiner to identify more specifically where and how Zhang discloses the aspects of Claim 7, or withdraw the rejection. Claim 7 is patentable over Zhang.

With respect to the Examiner's rejection of Claim 8 in light of Zhang, the present invention teaches a method wherein the data is associated with hashkeys of a hash function and where each storage zone is responsible for a subset of all hashkeys. In contrast, Zhang teaches a "distributed file system having a tree-like structure overlaid on a P2P system." (See, for example, column 2, lines 61-63). Applicants cannot find anywhere in Zhang that teaches, suggests, or discloses a method "where each storage zone is responsible for a subset of all hashkeys." Applicants respectfully submit that, with respect to the present invention, Claim 8 is patentable at least for the reasons stated above. Therefore, Applicants respectfully request the Examiner remove this rejection of Claim 8 or provide a more specific reference in Zhang where the claimed subject matter can be found.

With respect to the Examiner's rejection of Claim 10 in light of Zhang, Applicants respectfully submit that the Examiner has misconstrued the distinction between the storage slots of a fixed size, as claimed, and the Zhang reference. As previously discussed with regard to Claim 1 above, a storage slot as claimed in the present invention are not equivalent to a parent zone, as described in Zhang. To be sure, Zhang teaches that "the size of a parent zone can be selected based on a variety of factors, (e.g. number of nodes in the system). (See, for example, column 3, lines 55-67). However, Zhang fails to disclose "storage slots" or "storage slots" that "are of a fixed size." Accordingly, Applicants respectfully submit that, with respect to the

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present invention, Claim 10 is not anticipated by Zhang and is therefore patentable for at least the reasons stated above. Therefore, Applicants respectfully request the Examiner remove this rejection of Claim 10 or more clearly describe how Zhang teaches or suggests the invention of claim 10.

The Examiner rejected Claims 11-15 under 35 USC 102 as being unpatentable over Zhang (U.S. Patent No.: 6,985,928). This rejection is respectfully traversed. For the following reasons, Applicants respectfully submit that Claims 11-15 are patentable over Zhang.

With respect to the Examiner's rejection of Claim 11 in light of Zhang, Applicants respectfully submit that, as discussed above with the Examiner's rejection of Claim 1, the salient distinction between Zhang and the present invention was misconstrued. Zhang fails to teach, suggest, or disclose placing storage zones within a node. In the Office Action, dated June 16, 2006, the Examiner stated that both the present invention and Zhang teach a "p2p system consisting of nodes being in storage zones." (See Page 5, line 2). On the other hand, the claims of the present invention are directed to storage zones within a node and not to storage zones containing nodes, as taught in Zhang. As clearly stated in Claims 11 (and 1), the method of the present invention has "allocating one or more storage slots at each node in a peer-to-peer network, and a first portion of the storage slots allocated for storage zones and any remaining storage slots at each node allocated as a free slot reserve." (Emphasis added). This element of Claim 11 (and 1) is clearly not disclosed in Zhang. In the Office Action, dated June 16, 2006, the Examiner stated that both the present invention and Zhang teach a "p2p system consisting of nodes being in storage zones." (See Page 5, line 2). As previously discussed above with the Examiner's rejection of Claim 1, however, Applicants distinguish that the claims of the present invention are directed to storage zones within a node, and not to storage zones containing

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nodes as taught in Zhang. For at least this reason, Applicants respectfully submit that Claim 11 of the present invention is patentable over Zhang. Therefore, Applicants respectfully submits the Examiner's rejection has been overcome and respectfully request the Examiner remove his rejection of Claim 11.

Claims 11-15 are dependent on Claim 11 and are therefore distinguishable over Zhang for at least the reasons set forth above with respect to Claim 1. For the following additional reasons, Applicants submit that claims 12-15 are further patentable over Zhang.

The present invention teaches that "each physical node is allocated at least one storage zone, even as a new node is added to the system. When a new node is added to the peer-to-peer network, a search is conducted for a node with at least two zones, one of which can be transferred to the new node. If none exists, then what the inventors refer to as an "eager split" occurs: one of the storage zones is split into two portions even before it reaches its full capacity, and one of the two portions is transferred to the new node. Zones can be split "eagerly" so that each physical node has at least one zone but no more than one eagerly split zone." (See, for example, paragraph 6 of the present Specification). With respect to the Examiner's rejections of Claims 12-15, Applicants respectfully submit that the foregoing clearly distinguishes the present invention from Zhang. Again, Zhang teaches the splitting of a parent zone(s) in which nodes are located. In contrast, it is clear that in the present invention a storage zone(s) is located within a node itself. In fact, the present invention teaches that when a storage zone at the another node is eagerly split into a first and second portion, the second portion is transferred to a new storage zone at a new node. (See, for example, paragraph [0020] of the Specification). Applicants respectfully submit that, with respect to the present invention, Claims 12-15 are patentable at least for the reasons stated above. Moreover, these claims are patentable for at least the

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additional reason that Zhang does not anticipate, teach, or suggest a storage zone being transferred from within one node to within another. Therefore, Applicants respectfully request the Examiner remove this rejection to Claim 4 of the present invention.

The Examiner rejected Claim 16 under 35 USC 102 as being unpatentable over Zhang (U.S. Patent No.: 6,985,928). This rejection is respectfully traversed. Applicants have amended Claim 16 to more clearly claim the invention of the subject application. For the following reasons, Applicants respectfully submit that Claim 16 is patentable over Zhang.

With respect to the Examiner's rejection of Claim 16 in light of Zhang, Applicants respectfully submit that Zhang does not describe a node that is allocated more storage slots than its actual physical storage capacity. Zhang describes storage utilization as "the memory capacity being used to store objects in a node at a given time." (See, for example, Column 5, lines 17-19). Further, Zhang teaches that "storage capacity may be over 80%" (See, for example, Column 5, lines 21). (Emphasis added). In contrast, the present invention teaches that "each node is allocated more storage slots than its actual physical capacity." (See, for example, Specification paragraph [0022]). In essence, virtual slots are formed in the present invention. Zhang fails to teach or suggest such an approach. Applicants respectfully submit that, with respect to the present invention, Claim 16 is patentable at least for the reasons stated above. Moreover, this claim is patentable for at least the additional reason that Zhang does not anticipate, teach, or suggest that each node is allocated more storage slots than its actual physical storage capacity. Therefore, Applicants respectfully submit that the Examiner's rejection has been overcome and respectfully request the Examiner remove this rejection of Claim 16.

The Examiner also rejected claims 17-20 under 35 USC 102(c) as being anticipated by Zhang. These rejections are respectfully traversed. Claims 17 and 18 have been amended to

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more clearly claim the invention of the subject application. Claims 17-20 are dependent on claim 16 and are patentable over Zhang for at least the aforementioned reasons given with respect to claim 16. For the following additional reasons it is submitted that claims 17-20 are further patentable over Zhang.

With respect to the Examiner's rejection of Claim 17 in light of Zhang, Zhang does not teach a method in which the number of slots maintained by the node is equal to  $2 \times N-1$  where N is a number of slots that would fill the node's actual physical capacity. Rather, Zhang describes a method of placing nodes within a parent zone which is divided into subzones based upon a "zoom-in algorithm" (See, for example, column 3, line 47 – column 4, line 54). (Emphasis added). As previously discussed, Zhang teaches that an object is located within a node and, in turn, that node is located within a zone. The present invention, however, teaches that an object is located within a zone and, in turn, that zone is located within a node. In fact, Applicants cannot find the allocation of storage within a node taught anywhere in Zhang. Applicants respectfully submit that, with respect to the present invention, Claim 17 is patentable at least for the reasons stated above. Moreover, this claim is patentable for at least the additional reason that Zhang does not anticipate, teach, or suggest a method in which the number of slots maintained by the node is equal to  $2 \times N-1$  where N is a number of slots that would fill the node's actual physical capacity. Therefore, Applicants respectfully submit that the Examiner's rejection of Claim 17 has been overcome and respectfully request the Examiner to remove this rejection of Claim 17. Applicants respectfully request the Examiner to specifically identify where and how Zhang teaches or suggests the approach provided in Claim 17, or withdraw this rejection.

With respect to the Examiner's rejection of Claim 18 in light of Zhang, Zhang does not teach, suggest, or disclose a node where objects stored in a slot at the node are transferred to

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another node in the peer-to-peer network if the objects inserted into the slots at node fills the actual physical capacity of the node. Zhang describes storage utilization as “the memory capacity being used to store objects in a node at a given time.” (See, for example, Column 5, lines 17-19). Further, Zhang teaches that “storage capacity may be over 80%” (See, for example, Column 5, lines 21). (Emphasis added). In contrast, the present invention teaches that “each node is allocated more storage slots than its actual physical capacity.” (See, for example, Specification paragraph [0022]). Applicants respectfully submit that, with respect to the present invention, Claim 18 is patentable at least for the reasons stated above. Moreover, this claim is patentable for at least the additional reason that Zhang does not anticipate, teach, or suggest that each node is allocated more storage slots than its actual physical capacity. Therefore, Applicants respectfully request the Examiner to remove this rejection of Claim 18.

Applicants have added new Claims 21-27 to more completely claim the invention of the subject application. Support for these claims may be found in the Specification at, for example, paragraphs 13-17. These new claims are further patentable over Zhang because of the unique language that makes more explicit the relationship between nodes, slots, and zones.

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Applicants respectfully submit that Claims 1-27 are in condition for allowance, and notice to that effect is earnestly solicited. If for any reason the Examiner believes that the present application is not now in condition for allowance, the Applicants request an Examiner Interview to discuss the invention and any remaining rejections. The Examiner may contact the undersigned to discuss the invention or set up an Examiner Interview by calling the telephone number listed below or my mobile telephone at 703-731-7220.

Respectfully submitted,



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